



Original Research Article

Prevalence of thalassemia in antenatal patients in a rural tertiary care centre of western Uttar Pradesh

Neelam Swaroop¹, Priyanka Laspal^{1,*}, Shikha Seth¹, Vandana Verma¹¹Dept. of Obstetrics and Gynaecology, Uttar Pradesh University of Medical Sciences, Etawah, Uttar Pradesh, India

ARTICLE INFO

Article history:

Received 06-10-2019

Accepted 18-10-2019

Available online 06-12-2019

Keywords:

Haemoglobinopathies

Rural region

Antenatal care

Anemia

ABSTRACT

Anaemia in pregnant women is a serious world-wide public health problem with adverse pregnancy outcomes. Haemoglobinopathies and thalassemia constitute a major bulk of non communicable genetic diseases in India. The present study is being done to know the prevalence of thalassemia in a rural tertiary care centre of Western Uttar Pradesh, India. A total of 340 anaemic pregnant women were included in our study. Out of 340 pregnant females, 71.47% were found to have iron deficiency anaemia, megaloblastic (18.23%), dimorphic anaemia (6.2%) and haemoglobinopathies 4.1%.

© 2019 Published by Innovative Publication. This is an open access article under the CC BY-NC-ND license (<https://creativecommons.org/licenses/by/4.0/>)

1. Introduction

Haemoglobinopathies are group of genetic disorders in which there is a quantitative or qualitative abnormal production or structure of haemoglobin.^{1,2} It is the one of the commonest single gene disorder in the world first noted in the Mediterranean population, causing a significant morbidity and mortality in India and abroad.³ Prevalence of beta thalassemia carrier status is as high as 17% in certain communities of India.⁴ Beta (β) thalassemia and sickle cell disease are the most common haemoglobinopathies as per literature.⁴

They are responsible for moderate to severe haemolytic anaemia and high degree of morbidity among vulnerable segments of the society like infants and children, adolescent girls, pregnant women, etc and several deaths in India.³

During pregnancy, women with thalassemia minor show significant anaemia, which is most prominent during the latter half of the second trimester and early third trimester.⁵ The impaired globin synthesis impairs oxygen transport and delivery to tissues, placental bed and fetus because of limited haemoglobin oxygen binding. In severe

disease states, the accumulation of iron stores in vital organs of maternal systems can lead to chronic organ dysfunction. Thalassemia intermedia and major are severe form of disease which require frequent blood transfusions and associated with morbidity and mortality. Therefore it is important to know the type of anaemia to avoid complications.

Premarital and antenatal screening should be mandatory to prevent the birth of offspring with beta thalassemia major.

The present study is attempted to know the prevalence of thalassemia in the antenatal population in rural tertiary care centre of Western Uttar Pradesh, so that definite plan of action regarding the diagnostic, preventive and therapeutic strategies can be formulated to minimize more serious disorders in future generations.

2. Materials and Methods

This study was conducted in the department of Obstetrics and Gynaecology with collaboration of department of Pathology and Biochemistry, over a period of 18 months from January 2017 to June 2018. All the antenatal cases who came for routine antenatal care or admitted in the labour ward in latent or active phase of labour, were

* Corresponding author.

E-mail address: priyankalaspal111@gmail.com (P. Laspal).

evaluated thoroughly and those found fit based on our inclusion and exclusion criteria were enrolled in our study population.

The study was conducted after getting ethical clearance from ethical committee. Written informed consent was secured from study participants after explaining about the objective and purpose of the study to each participants. The participants were also assured about the confidentiality of the data.

All subjects were interviewed with the predesigned, pretested proforma and clinical examination was done. All the basic antenatal investigations were sent and those with Hb less than 11g/dl were enrolled for our study.

After fulfilling the inclusion criteria all the eligible candidates with microcytic hypochromic anaemia on GBP were given iron therapy for 4weeks.

Respond to iron therapy was noted after 4weeks by repeating all the investigation, whether haematological parameters improved or not.

Specific test for haemoglobinopathies by High Performance Liquid Chromatography (HPLC) was done in all cases wheather haematological parameters improved or not.

3. Result

In our study 395 cases were enrolled but 55 cases lost to followup, therefore finally the study was done on 340 cases, to know the prevalence of different types of anaemia, their spectrum and haemoglobinopathies.

In our study more than one third of patients had moderate anaemia (44.7%) followed by mild (35%) and severe (20.3%). Table 1. Iron deficiency anaemia (71.47%) has the highest prevalence, followed by megaloblastic anaemia (18.23%) and dimorphic anaemia (6.2%). Table 2.

The prevalence of haemoglobinopathies in study population was 4.1% among anaemic pregnant cases. Out of which 92.85% cases had β thalassemia trait and 7.14% case had Hb D Punjab. Table 3.

In our study there was significant rise in haemoglobin level after 4weeks of iron therapy. The rise in haemoglobin level was seen more in cases with nutritional anaemia as compared haemoglobinopathies. Table 4.

Table 1: Distribution of cases according to WHO classification of anaemia

Grades of anaemia	No. (n=340)	Percentage (%)
Mild (9-11g/dl)	119	35.0
Moderate (7-9g/dl)	152	44.7
Severe (<7g/dl)	69	20.3

4. Discussion

Anaemia in pregnancy is one of the common health problem in developing countries. Among all the various

Table 2: Prevalence of anaemia in study population

Anaemia	No. (n=340)	Percentage (%)
Haemoglobinopathy	14	4.1
Dimorphic	21	6.2
IDA	243	71.47
Megaloblastic	62	18.23

population groups studied, iron deficiency anaemia and thalassemia syndromes, especially beta thalassemia trait (BTT), are the two most common microcytic hypochromic anaemias which⁶ are highly prevalent in India. Therefore, this study aimed to determine the prevalence of thalassemia in pregnant women in western Uttar Pradesh.

A study protocol was made and a total of 340 subjects were enrolled who fulfilled the inclusion criteria.

According to WHO parameter, anaemia is graded as mild, moderate and severe anaemia. In our study more than one third of patients had moderate anaemia (44.7%) followed by mild (35%) and severe an aemia (20.3%). (Table 1)

The result of our study was similar to the study conducted by Neha Tyagi et al⁷ in which prevalence of moderate anaemia was found to be highest 60.30% followed by mild anaemia 32.5% and severe anaemia 7.23%.

High prevalence of moderate and mild anemia in our study alarms us to take prompt action to minimize the overall high load of anaemic pregnant women in this area.

Spectrum of anaemia in our study shows that iron deficiency anaemia has the highest prevalence (71.47%), followed by megaloblastic (18.23%) and dimorphic anaemia (6.2%). The prevalence of haemoglobinopathies was 4.1% in our study group. (Table 2)

Similar results were reported in study conducted by Sinha M et al⁸ in which seventy-eight (65%) had iron deficiency, 22 (18.3%) had dimorphic anaemia and 14 (11.6%) had haemolyticaemia. Megaloblastic anaemia was present in 6 (5%). Of haemolyticaemia, 50% were thalassemia trait.

Other studies conducted by Aydinok Y et al,⁹ Madan N et al¹⁰ and Kotwal J et al¹¹ have also found that MCV and MCH are effective parameters to know the spectrum of anaemia.

The prevalence of haemoglobinopathies in our study was 4.1% in anaemic pregnant population.

Among them 92.85% cases had β thalassemia trait and 7.14% case had Hb D Punjab. (Table 3)

Similar results were reported in the study conducted by Madhu Sinha et al⁸ in which the prevalence of haemoglobinopathies was 5.8%.

Other studies in antenatal cases have reported prevalence of β thalassemia trait to be 8.45%¹² and 3%.¹³ It was observed that iron therapy causes significant rise in haemoglobin level in anaemic subjects. The rise in haemoglobin levels was seen more in cases with nutritional

Table 3: Types of Haemoglobinopathies and their various haematological parameters

Types of Haemoglobinopathies	No. of Cases	Haemoglobin (Mean)	MCV	MCH	MCHC	RDW
β Thalassemia Trait	13	7.9 \pm 1.39	69.6 \pm 2.1	20.92 \pm 3.83	27.84 \pm 1.95	15.61 \pm 4.07
β Thalassemia Major	0	0	0	0	0	0
α Thalassemia	0	0	0	0	0	0
HbD Punjab	1	6.9 \pm 0	86.0 \pm 0	26.0 \pm 0	30 \pm 0	14.0 \pm 0

Table 4: Rise in haemoglobin levels after iron therapy

Types of anaemia	Hb (Mean \pm SD)		
	Initial	Repeat	P value*
Other Anaemias	8.06 \pm 1.44	9.60 \pm 1.64	<0.001*
Haemoglobinopathies	7.82 \pm 1.37	8.77 \pm 1.54	<0.001*

1 Student t test,*Significant, *p=0.001.

anaemia as compared to haemoglobinopathies.

The gold standard test for diagnosis of haemoglobinopathies is HPLC (High Performance Liquid Chromatography).

5. Conclusion

Very few studies are done in Western Uttar Pradesh for knowing prevalence of thalassemia in pregnancy. Prevalence of haemoglobinopathies was only 4.1%. Out of which 92.85% cases had beta thalassemia trait and 7.14% had HbD Punjab.

Primary screening should be undertaken in all pregnant women. Blood cell indices can be used as a cost effective method in pregnancy in resource limited setting. Due to high prevalence of haemoglobinopathies in India, a universal screening programme for haemoglobinopathies should be adopted in areas of high prevalence of thalassemia but in our study as the prevalence was not very high we can screen the high risk group after ruling out other anaemias.

HPLC (High Performance Liquid Chromatography) at present is the gold standard method for diagnosis of different types of haemoglobinopathies.

6. Source of funding

None.

7. Conflict of interest

None.

References

- Patel AP, Naik MR, Shah NM, Sharma NP, Parmar P. Prevalence of common haemoglobinopathies in Gujarat: An analysis of a large population screening programme. *Natl J Community Med.* 2012;3(1):112–116.
- Parikh UR, Goswami HM, Mehta RC, Patel PS, Gosai R. Incidence of haemoglobinopathies in women attending antenatal clinics in their first trimester. *NHL J Med Sci.* 2014;3(1):63–67.
- Balgir RS. Genetic epidemiology of three predominant abnormal haemoglobins in India. *J Assoc Physicians India.* 1996;44:25–28.

- Vaz FE, Thakur CB, Banerjee MK, Gangal SG. Distribution of beta thalassemia mutations in the Indian population referred to a Diagnostic Centre. *Haemoglobin.* 2000;24:181–194.
- Najmabadi H, Karimi NR, Sahebjam S, Pourfarzad F, Teimourian S, Sahebjam F. The beta thalassemia mutation spectrum in the Iranian population. *Haemoglobin.* 2001;25:285–296.
- Demir A, Yarali N, Fisgin T, Duru F, Kara A. Most reliable indices in differentiation between thalassemia trait and iron deficiency anemia. *Pediatr Int.* 2002;44(6):612–616.
- N, Akansha KA, Ranga S. Prevalence of type and severity of anaemia in antenatal cases in a Tertiary Care Hospital in North India. *Ann Women Child Health.* 2016;2(1):7–10.
- Sinha M, Panigrahi I, Shukla J, Khanna A, Saxena R. Spectrum of anemia in pregnant Indian women and importance of antenatal screening. *Indian J Pathol Microbiol.* 2006;49(3):373–375.
- Aydinok O, Oztop S, Nisli G, Kavakli K. Prevalence of beta thalassemia trait in 1124 students from Aegean region of Turkey. *J Trop Pediatr.* 1997;104(1):184–185.
- Madan N, Sikka M, Sharma S, Rusia U. Phenotypic expression of haemoglobin A2 in beta thalassemia trait with iron deficiency. *Ann Hematol.* 1998;77(3):93–96.
- Kotwal J, Saxena R, Choudhry VP, Dwivedi SN, Bhargava M. Erythrocyte indices for discriminating thalassaemic and non thalassaemic microcytosis in Indians. *Natl Med J India.* 1999;12(6):266–267.
- Do mothers with haemoglobinopathies anaemia require iron supplementation in pregnancy. *J Obs Gynae India.* 1994;44:177–180.
- Hendy J. Prevention of thalassemia in Australia. *Southeast Asian J Trop Med Public Health.* 1999;30(2):94–96.

Author biography

Neelam Swaroop Associate Professor

Priyanka Laspal Resident

Shikha Seth Professor

Vandana Verma Assistant Professor

Cite this article: Swaroop N, Laspal P, Seth S, Verma V. Prevalence of thalassemia in antenatal patients in a rural tertiary care centre of western Uttar Pradesh. *Indian J Obstet Gynecol Res* 2019;6(4):469–471.